CubeSat Cryocooler System (CCS), Phase I

Completed Technology Project (2015 - 2015)

Project Introduction

The vision of the CubeSat Cryocooler System (CCS) is to advance the state of the art in CubeSat Cryocooler systems by developing a high efficiency, low power, two-stage coldhead pulse tube cryocooler and integrating it with proven mini Low-Cost Cryocooler Control Electronics (mLCCE) to enable performance capabilities of detectors and sensors on NASA missions. The low-cost, low-weight, and small size of the CCS caters specifically to CubeSat applications. A key objective of this effort is to develop and demonstrate cryogenic cooling technologies that allow science measurement capabilities with smaller, more affordable spacecraft while concurrently reducing system risk, cost, size, and development time, consistent with NASA SBIR Science Subtopic S1.10. During the Phase I effort, a paper study will be conducted for the thermodynamic and mechanical design optimization of a two-stage pulse tube cryocooler configuration. Also during the Phase I effort, a Cryocooler Control Electronics (CCE) brassboard will be designed, fabricated, tested, and delivered in a proof-of-concept and risk reduction effort for a follow-on Phase II which would involve developing a space qualified system.

Primary U.S. Work Locations and Key Partners

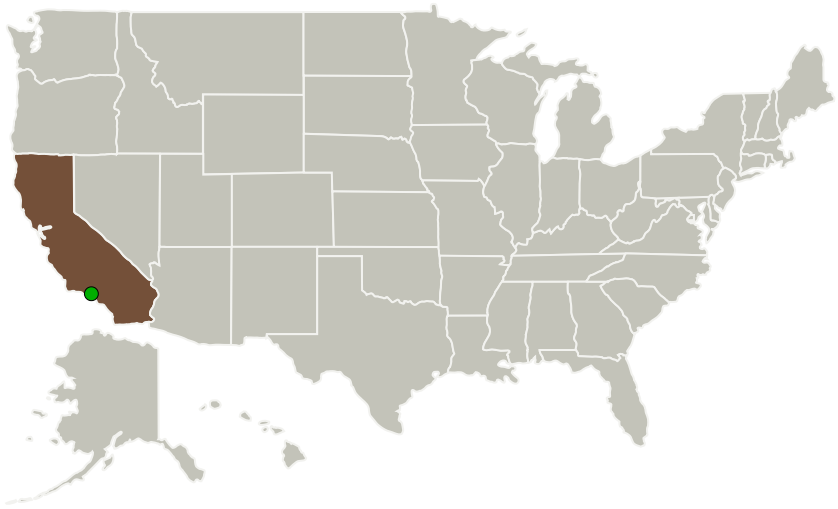

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Table of Contents

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Organizations Performing Work	Role	Type	Location
Iris Technology Corporation	Lead Organization	Industry	Irvine, California
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations
California

Project Transitions

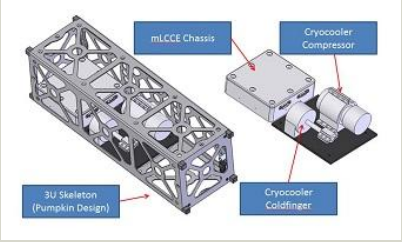
June 2015: Project Start

December 2015: Closed out

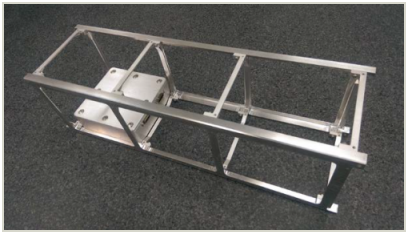
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138916)*

Images



Briefing Chart
CubeSat Cryocooler System (CCS) Briefing Chart
(https://techport.nasa.gov/image/132755)



Final Summary Chart Image
CubeSat Cryocooler System (CCS), Phase I Project Image
(https://techport.nasa.gov/image/131581)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Iris Technology Corporation

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

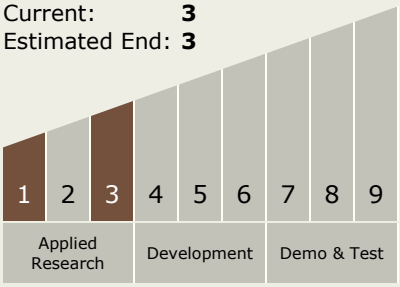
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Jim Wold

Technology Maturity (TRL)

Start: **1**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.1 Cryogenic Systems
    - TX14.1.3 Thermal Conditioning for Sensors, Instruments, and High Efficiency Electric Motors

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System